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How to Plan the Farm Layout

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W. I. Myers



A LARGE RECTANGULAR FIELD ADAPTED TO ECONOMICAL OPERATION

This field is 100 rods long and 40 rods wide

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LEGEND

Farm boundary unfenced	_____
Field division unfenced	_____
Temporary field division	_____
Lane	=====
Smooth wire fence	_____
Woven wire fence	_____
Stone fence	_____
Barbed wire fence	_____
Straight rail or board fence	_____
Virginia rail fence	_____
Brush, stump, or hedge fence	_____
Drainage or ditch covered	_____
Drainage or ditch uncovered	_____
Creek or river	_____
Marsh or swampy land	_____
Fruit trees bearing	_____
Fruit trees not bearing	_____
Woods	_____
Stone pile	_____
Bare rocks	_____
Railroad line	_____
Main farmstead	_____

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HOW TO PLAN THE FARM LAYOUT

W. I. MYERS

Labor efficiency has always been the keynote of American agriculture. American farmers have wasted land, but they have produced more product to the worker than any other farmers in the world. They have economized in labor, which was scarce, and have wasted land, which was plentiful.

The future problems of American farmers include a better utilization of land, a greater intensity of cultivation, and, at the same time, the maintenance of a high productivity of the individual worker. A well-planned farm layout offers one means of saving land and labor. A good farm layout should provide not only an efficient field arrangement, but also a well-planned farmstead, economical fences, convenient lanes and driveways, and the most profitable utilization of land.

WHY MANY NEW YORK FARMS NEED REARRANGING

Most of the farm land of New York was originally covered with forests, and a large part of it was more or less stony. These factors made the task of clearing the land for cultivation a long and laborious one, and their effect can still be plainly seen in the layout of many farms. The small, irregular fields resulting naturally from these conditions were not a serious drawback with the hand-labor methods of agriculture prevailing at that time. Nor were they difficult to fence, for with rail, stump, or stone fences the irregularity of the fields made little difference.

However, subsequent changes in methods of agricultural production, with their consequent effect on farms and farming, have given rise to most of the present problems of farm layout. The use of labor-saving machinery greatly increased the effectiveness of human labor and consequently increased the area of land that could be farmed by one person. But the small, irregular fields, resulting partly from topography and partly from the accidents of clearing, were a serious handicap to the use of machinery. Stone piles and other obstructions added to the difficulty of working these small, irregular fields with machinery. Steep slopes that had been mowed easily with a scythe or a cradle could not be cut with a mower or a reaper. Farm land not adapted to machine operation could not compete successfully in crop production with the more favored regions. Some entire farms were abandoned, while on other farms the fields not adapted to machine production were changed to pasture land.

Since the use of labor-saving machinery enabled them to work larger areas than their original farms, farmers began to combine these small farms into larger farm units. The increase in the use of machinery has continued to the present time and has resulted in a continual increase in the size of the farms, so that now many farms are composed of two or more original farms or parts of farms. These factors have complicated the rearrangement of farms necessary to meet changed conditions. Changes in farm arrangement have not kept pace with changing agricultural conditions, and because of this most farms now need rearranging.

IMPORTANT FACTORS IN PLANNING A GOOD FARM LAYOUT

Size of fields

Farm fields are often smaller than is either necessary or desirable, yet on many farms little attention has been paid to the enlarging of fields to permit more effective use of labor and machinery. The crop area is still cut up into small fields by the original stone rows or fences built when the land was cleared, simply because it is easier, in any one year, to farm around these obstructions than to remove them. Furthermore, there are constant forces tending toward the reduction of the size of fields. Perhaps the seeding on part of a meadow fails; the patch is then plowed up and thereafter is often farmed as a separate field; sometimes a drought prevents planting the entire field to the desired crop.

The most important factor in the layout of farms is the size of the farmed fields, for this involves not only the efficiency of labor, but also the economy of fencing and of land.

For economy of labor, fields should be large. The importance of the effect of the size of fields on labor depends on the number of horses driven and on the operation to be performed. The negro with one mule can farm small fields; but when three- to six-horse teams are used, the fields should be large. With tractors it is even more important to have large fields.

The effect of size of fields on the labor required to plow an acre, on some New York farms keeping complete cost accounts, is shown in table 1. As the average size of the fields increased, the time necessary to plow an acre decreased. One reason for the saving of labor with large fields is the decrease in the loss of time in turning. If the fields in the table were plowed with a 14-inch plow, 110 turns per acre would be necessary in plowing the 1-acre fields, while only 29 turns per acre would be necessary in the 27-acre fields. In addition to the time necessarily lost in turning, there is a tendency to rest oftener when turns are frequent. Large fields permit greater labor efficiency in all field operations. Size of fields is less important in mowing than in other farm operations because large fields are not usually mowed as one field, but in two or more parts.

TABLE 1. RELATION OF SIZE OF FIELDS TO LABOR REQUIRED TO PLOW AN ACRE

Size of fields (acres)	Number of fields	Average size of fields (acres)	Average length of fields (rods)	Time required to plow one acre	
				Man hours	Horse hours
Less than 2	40	1.02	20.6	8.5	19.8
2-4.9	57	3.48	34.6	6.5	15.0
5-9.9	78	7.24	49.9	6.2	16.2
10-14.9	40	11.68	54.7	5.7	14.3
15 or more	27	20.26	77.9	5.1	13.2
Total	242	.....	.....	.....	.....
Average .....	.....	7.51	45.4	5.8	14.8

Fences around crop fields make more or less land untillable. With fields of the same shape, the larger the field, the fewer rods of fence to the acre are required to inclose it. Therefore, with larger fields a proportionally smaller area of tillable land is occupied by fences. If a square field of 1 acre is fenced, about 50 rods of fence are required to inclose it; while only 8 rods of fence to the acre are required to inclose a square field of 40 acres. If the width of the land occupied by fences in the two fields were uniform, the amount of waste land to the acre would be more than six times as much in the 1-acre field as in the 40-acre field.

The effect of size of fields on the economy of fencing and of land on some New York farms is shown in table 2. In these results, the number of rods of fence to the acre includes all the fence around each field. When a fence serves for two fields, the amount of fence necessary for each would be correspondingly reduced. If one of these farms had been divided into 2-acre fields, about 4.6 per cent of the crop land would be occupied by fences.

TABLE 2. RELATION OF SIZE OF FIELDS TO ECONOMY OF FENCING AND OF LAND IN CROP FIELDS COMPLETELY FENCED

Size of fields (acres)	Number of fields	Average size of fields (acres)	Rods of fencing to the acre	Per cent of crop land occupied by fences
Less than 4.....	26	2.1	37	4.6
4-7.9.....	41	6.3	21	3.7
8-11.9.....	64	9.8	17	2.7
12-15.9.....	27	13.3	15	2.3
16-23.9.....	24	18.4	13	1.8
24 or more.....	12	38.3	9	1.1
Total.....	194	.....	.....	.....
Average.....	.....	11.4	15	2.3

The size of the farm, the type of farming, and the length of the rotation or rotations followed, limit the size of the fields. With the practice of more or less definite crop rotations, it is desirable to have as many fields as there are years in the rotation, and to have the fields of approximately equal size. For example, with 100 acres of land available for general crops, and a five-years rotation, the most desirable size of field would be 20 acres. This would give five 20-acre fields. On some farms two separate rotations are followed—a short rotation of more intensive crops on fields near the buildings, and a longer rotation of more extensive crops on the remoter fields. Under these conditions a greater number of fields would be desirable, the number and size depending on the length of the rotations and the area of land available for crops. Where truck crops are grown, many fields of small or medium size are necessary.

Physical features, such as shape of farm, differences in soil or drainage, streams, and swamps, often make it impossible to have all the farmed fields as large as the crop area and the rotation make desirable. In such

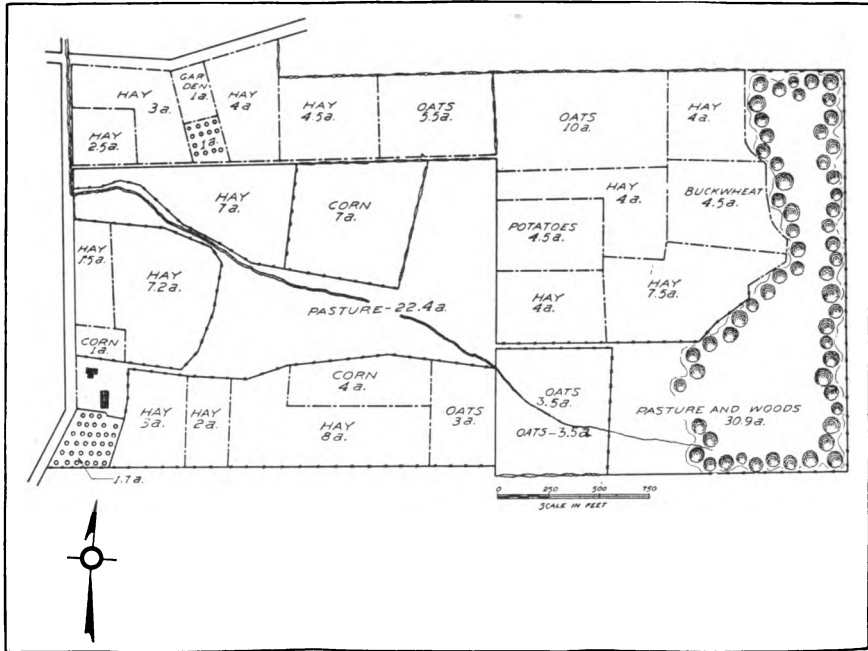


FIG. 130. AN EXAMPLE OF PATCH FARMING

The crop land was farmed in twenty-four fields averaging 4.5 acres each. There were three patches of corn, five of oats, one of potatoes, one of buckwheat, and fourteen of hay on this farm in 1914. There were few obstacles to prevent the enlarging of the fields and this has been done since the map was made. Much time that was formerly lost in farming these small, scattered patches of different crops has been saved by combining them into large fields.

Farm area, 212 acres
Average size of farmed fields, 4.5 acres

cases, two, or sometimes even more, fields may be farmed together as one year of the rotation.

Shape of fields

The shape of farm fields likewise has an important effect on the economical use of labor, fencing, and land.

It is a fact commonly accepted that more time to the acre is required for performing farm operations in fields of irregular shape than in fields of regular shape. Therefore any irregularity in the shape of a farm field is undesirable. The larger the proportion of short rows, the worse is the shape of the field and the greater is the amount of labor wasted in farming it. Triangular fields have the largest proportion of short rows and are therefore the most wasteful of labor. Square fields are bad if they are small, because with mowing or other operations that require going around the field the bouts become extremely short near the finish; if they are large enough to be cut in two for these operations, however, square fields are satisfactory. For fields of moderate size, the oblong shape is the best. The most desirable proportions depend somewhat on the size of the field and on the number of operations to be performed crosswise of the field. Oblong fields from one and one-half to three times as long as their width

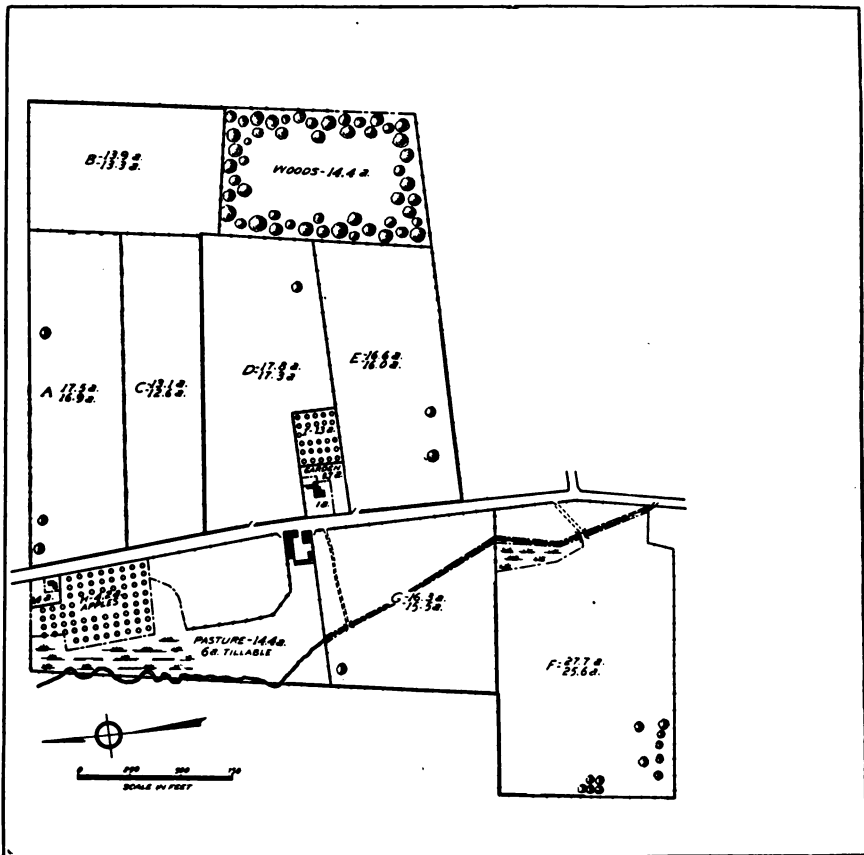


FIG. 131. A FARM SMALLER IN TOTAL AREA BUT A LITTLE LARGER IN CROP AREA THAN THAT SHOWN IN FIGURE 130

The fields are large and most of them are of good shape. In this and the following farm maps, two figures are given for the area in each crop field. The top figure is the total area of the land within the field boundaries, while the lower figure is the net crop area after deducting the amount of land occupied by fences, stone piles, ditches, or other obstructions

Farm area, 163 acres
Average size of farmed fields, 16.7 acres
Average distance to farmed fields, 43 rods

are usually satisfactory (cover cut). Small fields should be proportionately longer than large fields, in order to provide long rows. Fields long in proportion to their width are very convenient for plowing and other operations performed lengthwise, but are inconvenient for dragging or cultivating crosswise. In New York State little cultivating is done crosswise, and hence this drawback is not important. When a tractor is used, the length of the field is the most important consideration.

The smaller the field, the more important is its shape; and the larger the field, the less important shape becomes. Even the short rows in a large field may be longer than the longest rows in a small field. A dozen short rows in a 2-acre field may mean a considerable proportion of time wasted,

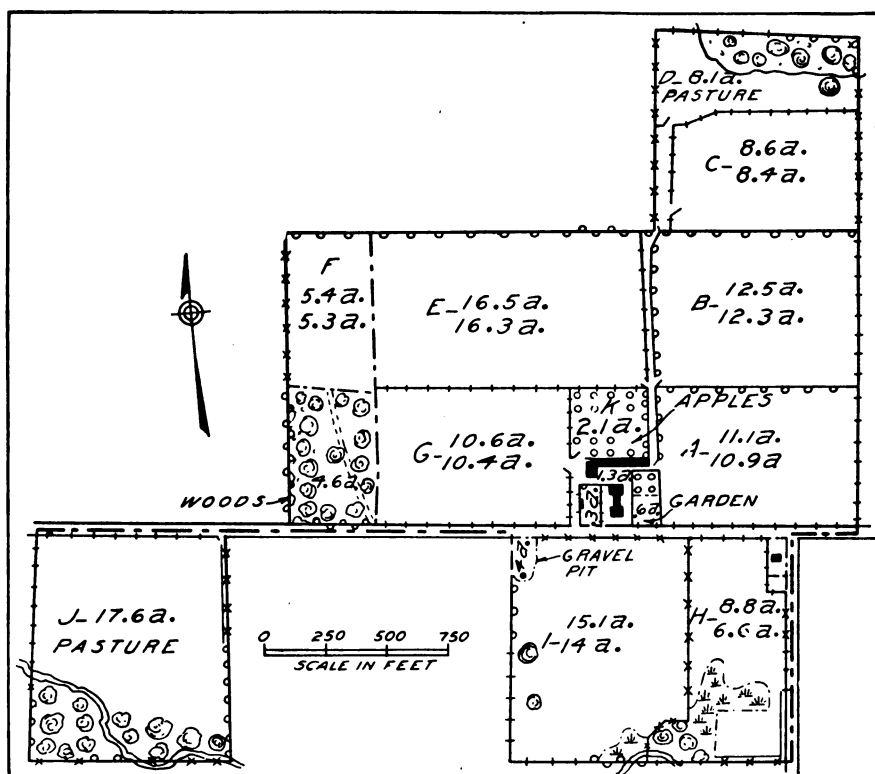


FIG. 132. A GOOD FARM LAYOUT IN CENTRAL NEW YORK

Most of the fields are of good size and shape. A four- or five-years rotation is followed. Fields A and C, B and G, H and I, and E and F have been farmed together, each pair of fields making up a course in the rotation. There are some unnecessary fences which could easily be removed

Farm area, 126.3 acres
Average size of farmed fields, 10.5 acres
Average distance to farmed fields, 32 rods

while the same number of short rows in a 20-acre field would have but little effect on the labor necessary to farm it.

The importance of the effect of shape of field on labor depends also on the operations to be performed and hence on the crops grown. The more intensive crops require a greater number of operations, and therefore a larger amount of time is wasted by growing such crops in irregular fields. With extensive crops, such as hay or alfalfa, the waste of time in irregular fields is less important. This fact is recognized by farmers, and very badly shaped fields are usually kept in hay as much of the time as possible.

Square fields require the fewest rods of fence to the acre for a given size. A square field of 10 acres would require 160 rods of fence to inclose it. A rectangular field 80 by 20 rods would include the same area but would require 200 rods of fence. With the annual cost of fence maintenance at 6 cents a rod, it would cost \$2.40 a year more to keep the rectangular field fenced. All irregularly shaped fields are costly to fence because of the large number of corner posts necessary. Corner posts are

the most expensive and the weakest parts of a fence. Many line posts can be driven in the time required to set and brace one corner post properly.

For the field of ordinary size the oblong shape permits the most efficient use of labor, while the square shape is the most economical of fencing and of land. For pastures, therefore, the most economical shape is square, because this provides the shortest line of fence and requires only four corner posts. Saving labor is usually more important than saving land and fencing, and hence oblong shapes are the most desirable for crop fields of moderate size. Very large crop fields may be square to save fencing, and yet be long enough to permit efficient use of labor. Irregular shapes should be avoided when this is possible without too great expense.

The shape of farm fields has been affected by topography, drainage, streams, soil, and other natural factors, as well as by the manner in which the farms were cleared. In some cases the shape of the fields is the result of natural features, and rearrangement to make fields of better shape is impossible. In other cases the cost of improving the shape of the fields would be greater than any possible saving. But in many instances such improvements can be made easily and at reasonable expense. Before undertaking any rearrangement, the probable savings and costs should be given careful consideration.

Distance to fields

Travel between barns and crop fields is not directly productive work. It is merely getting ready to do something. For this reason crop fields should be as readily accessible to the farmstead as possible.

The inaccessibility of the fields on many farms is a natural consequence of the way in which farm layouts have developed. In the first place, little attention was paid to this consideration in laying out the original farms. Again, as farms have been combined, it has not always been possible to buy land adjacent to the farm already owned. Just as the layout of some farms has been improved by combination, that of others has been made worse. Within reasonable limits it is more important to have enough land than to have it convenient for working; or, in other words, the advantage of having more land may offset the disadvantages of an inconvenient location.

The importance of the effect of the distance to the fields depends principally on the crops grown. For any given rotation of crops, the relative values of near-by and distant fields can be easily determined. With a five-years rotation of silage corn, oats, wheat, hay, hay, the minimum number of trips to the acre, with average yields, would be about as follows:

	Man trips to the acre	Horse trips to the acre
Silage corn (including 10 loads of manure to the acre)	18.0	48.0
Oats	3.5	8.0
Wheat	3.5	8.0
Hay	2.1	3.8
Hay	2.1	3.8
Total above rotation	29.2	71.6
Annual average for above rotation (approximately)	6	14

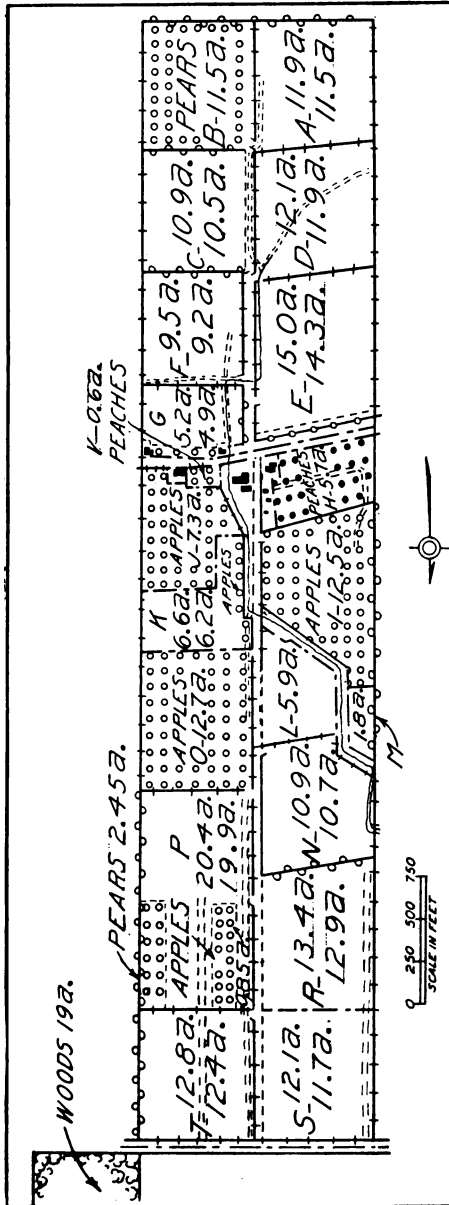


FIG. 134. A MUCH BETTER PLAN THAN THAT SHOWN IN FIGURE 133

Altho the farms are of nearly the same proportions, the farmstead in this case is nearer the center of the farm

**Farm area, 228.2 acres
Average size of farmed fields, 9.7 acres
Average distance to farmed fields, 87 rods**

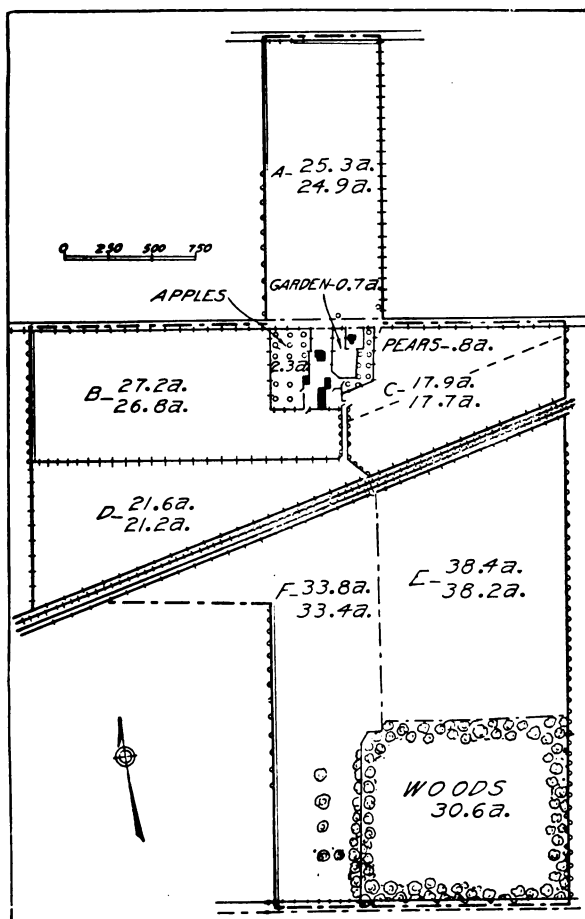


FIG. 135. A GOOD FARM LAYOUT IN WESTERN NEW YORK

All of the fields can be reached from the farmstead with a minimum of travel. The fields are large, but some of them are very irregular. Field A has rows 100 rods long and is almost ideal for efficient operation

Farm area, 204.4 acres

Average size of farmed fields, 27 acres

Average distance to farmed fields, 30 rods

If a field is a half mile distant from the barn, each round trip means a mile of travel, or at least 6 man miles and 14 horse miles of travel a year for each acre, with the above rotation. This would require at least 2 hours of man time and 4.5 hours of horse time, which, at 30 cents an hour for man labor and 20 cents an hour for horse labor, would cost about \$1.50. Since \$1.50 is 6 per cent interest on \$25, it is evident that a field adjoining the barn would be worth about \$25 an acre more for general farming than an equally good field a half mile away, under the conditions given.

The average distance between farmstead and fields depends chiefly on the size of the farm, the shape of the farm, the location of the farmstead

with respect to the fields, and the size and arrangement of the fields. Other factors remaining constant, the larger the farm, the greater is the distance between farmstead and fields. This is one of the most important factors limiting the size of farms. If the size of a farm be indefinitely increased, a point will be reached where the advantages of greater size are offset by the time lost in travel between buildings and fields. Any further increase in size then necessitates a duplication of buildings.

The shape of the farm is nearly as important as the size in its effect on distance to fields. All long, narrow shapes are bad, since they mean that much of the land is farther from the buildings than it would be if the farm were more nearly square (fig. 133). Square, or nearly square, farms permit the most convenient arrangement of fields with respect to buildings (fig. 135). The ideal arrangement is to have half of the land on each side of the highway, with the buildings in the center of the farm. By this arrangement the travel to the fields may be reduced to a minimum while the advantages of living on the highway are retained. With any shape of farm and with the usual systems of farming, the most advantageous location for the buildings, from the standpoint of labor efficiency, is in the center of the crop land; but if this necessitates locating the buildings away from the highway, the disadvantages of the plan more than offset the saving of labor, except in the case of very large farms. In some cases it is possible to put the house on the road by running a road thru the farm. When this can be done, the advantages to be gained outweigh the value of the land lost. The location of the buildings in the middle of the side of the farm on the road is usually preferable to placing them in the corner nearest town.

It is generally desirable to have as many fields as possible corner on the farmstead. Often the average distance to the nearest corner of the crop fields can be reduced by enlarging the fields. Gates should be located so as to afford the most convenient access to fields.

Because of the greater cost of farming distant fields, farmers tend to keep such fields in less intensive crops. In New York, fields too remote to be cultivated economically are kept in hay almost continuously. If the hay from such fields is to be sold, it is usually stacked or drawn to a near-by barn rather than to the main buildings. Fields too distant to be profitably cropped even with hay are used for pasture. By such plans farmers have adjusted their practice to make the best of bad field arrangements.

On many farms the remote fields are never manured and are therefore continually getting poorer. Frequently such fields, too distant to be farmed economically by their owners, are directly across the road from a neighbor's house. The best way to put the buildings in the middle of the farm is to buy the land across the road when this is possible.

Obstructions in fields

The difficulties in farming the small, irregular fields found on many farms are often further increased by obstructions of various kinds, such as swampy spots, open ditches, streams, stone piles, and trees. Not only do these obstructions waste land, but, what is usually more important, they waste labor in farming around them. Swampy spots, open ditches, and streams often divide the crop land into fields of irregular shape.

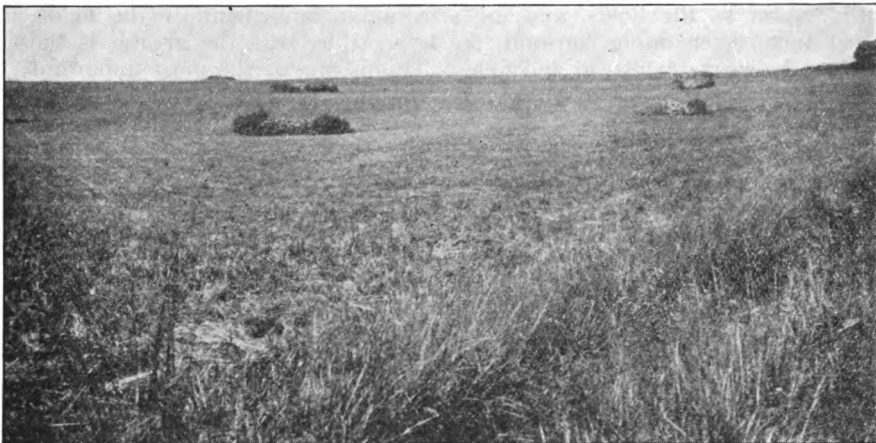


FIG. 136. SMALL SCATTERED STONE PILES WHICH WASTE BOTH LAND AND LABOR

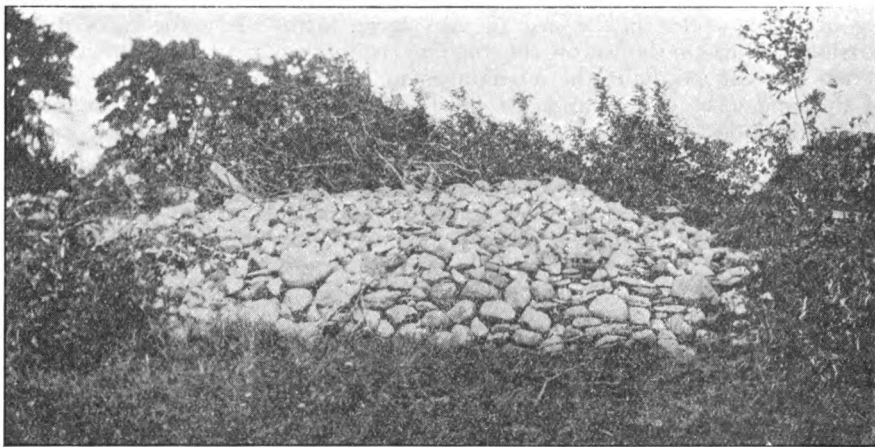


FIG. 137. A LARGE STONE PILE IN THE CORNER OF A CROP FIELD

This stone pile occupies little land and does not interfere with cultivation. The stones are convenient for drawing if needed for improved highway

Open ditches are continually filling up with dirt and weeds so that their annual upkeep is a considerable item. Frequently, the double saving of land and labor justifies the elimination of these obstructions to cultivation by the use of tile drains.

Fences

The early settlers on New York farms made fences of rails, stumps, or stones. With cheap labor, cheap land, and cheap fencing materials, such fences were satisfactory. Labor and land are no longer cheap, and fencing materials must be purchased at increasing prices. As a result, the problem of fencing farms economically has become important.

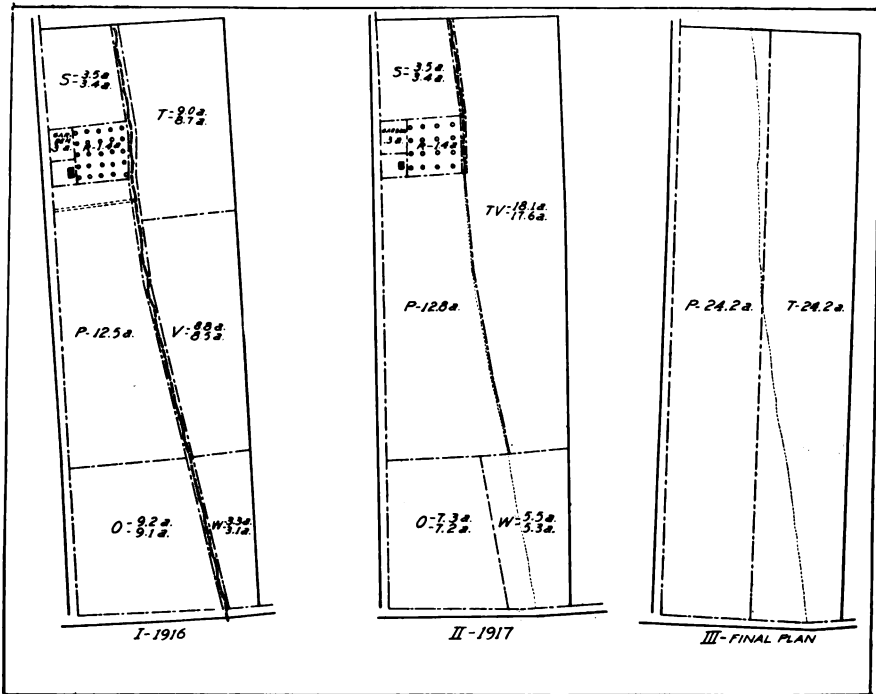


FIG. 138. PLANS OF A 50-ACRE TRACT SHOWING ARRANGEMENT BEFORE AND AFTER TILING AN OPEN DITCH

In the fall of 1916 and the spring of 1917, the open ditch was tiled as shown, and the land formerly occupied by it was cleared for cropping. After completing the tiling, clearing the worthless orchard, and moving the tenant house, the owner will work the tract in two large, oblong fields, as shown in III. The value of the land reclaimed paid more than half of the cost of tiling this open ditch. The labor saved by the elimination of about 200 short rows will soon repay the remainder of the cost.



FIG. 139. A STONE ROW THAT FUNCTIONS AS A FENCE ONLY IN WASTING LAND AND IN FORMING A BARRIER TO CULTIVATION

This stone row occupies a strip of land 20 feet wide. Land here is worth \$100 an acre

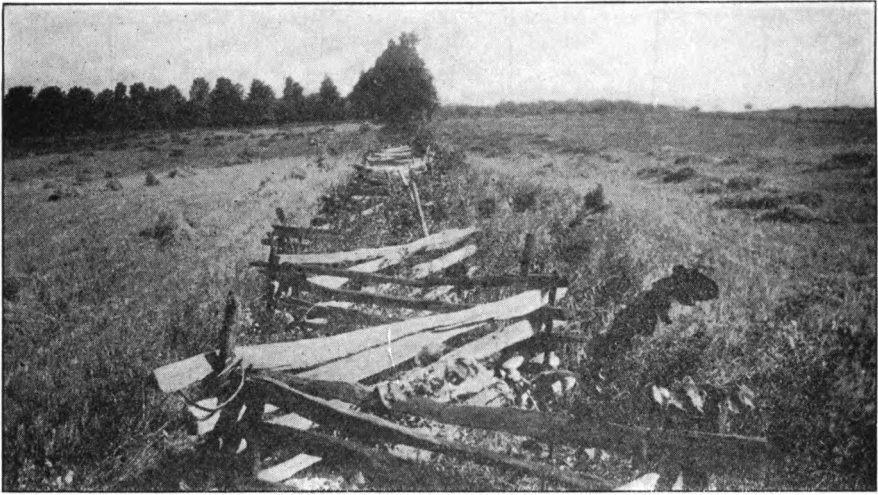


FIG. 140. UNNECESSARY WASTE OF LAND BY FENCING

Every rod of this fence wastes land worth \$1, besides furnishing an ideal protection for weeds, brush, and woodchucks. Field fences are unnecessary in this region since little stock is kept

A considerable area of crop land is made untillable by fences. On some New York farms the land wasted by fences was found to average about 2 acres per farm. While part of this waste is necessary, a considerable proportion is not. Unnecessary fences should be taken out. Where fences are necessary they should be constructed so as to waste as little land as possible. The width of waste land along many fences is increased by

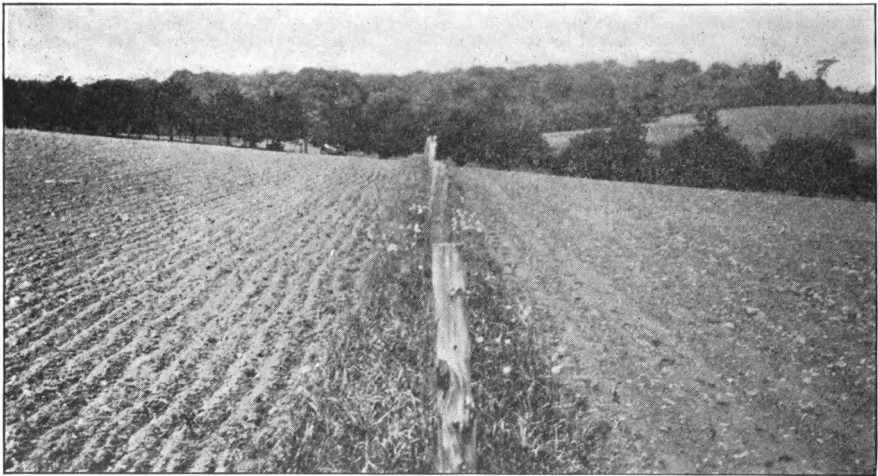


FIG. 141. A WOVEN-WIRE FENCE BETWEEN TWO CORNFIELDS

Even under the most favorable conditions, fences make untillable a considerable strip of ground. This wire fence occupies a strip of land 6 feet wide

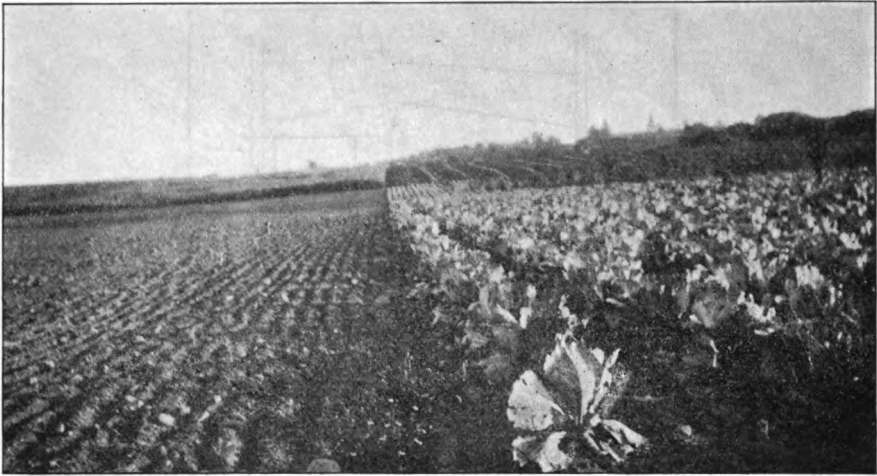


FIG. 142. UNFENCED FIELD LINES WHICH OCCUPY NO LAND AND DO NOT INTERFERE WITH CULTIVATION

On this farm little stock is kept and fenced crop fields are both unnecessary and undesirable

the accumulation of stones taken from the field and thrown along the fence. When stones are once picked up they should be piled on untillable land or in the corner of a crop field.

There are many advantages, and likewise many disadvantages, in fencing crop fields. If fields are fenced, the permanent pastures may be supplemented by pasturing meadows and grain fields after harvest. On the other hand, fences involve maintenance costs and prevent the adjustment of field lines to changed conditions. If much stock is kept, it usually pays to fence at least a part of the crop fields unless the crop area is very limited and the fields are small.



FIG. 143. TWO SIDES OF A WOVEN-WIRE FENCE

On the left the brush is cut and the fence occupies but 2 feet of land. On the right the brush and the fence occupy a strip of land 6 feet wide

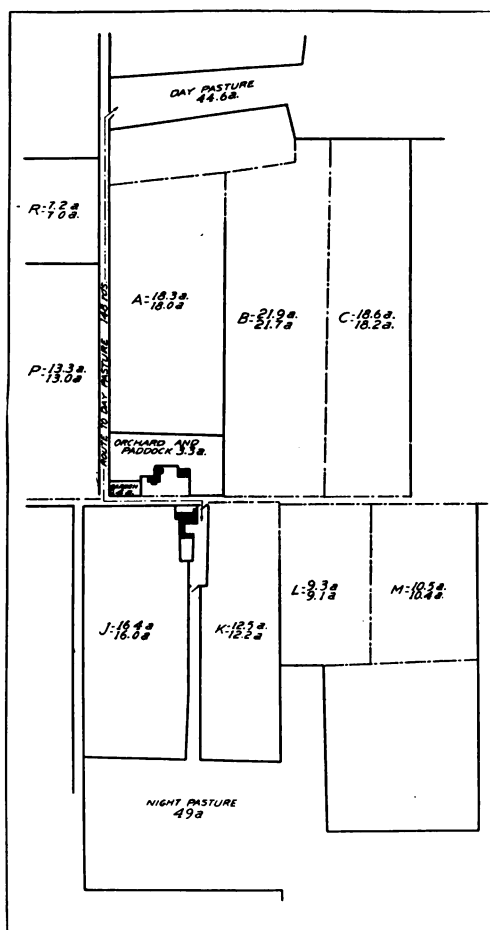


FIG. 144. PLAN OF A CENTRAL NEW YORK DAIRY FARM, SHOWING THE PRESENT ROUTE TO THE DAY PASTURE

Since there is no lane to this pasture, the herd of fifty cows must be driven up the highway to and from this field each day. The two round trips necessary consume about two hours daily during the pasture season

Lanes and driveways

On farms where much stock is kept, a lane is usually desirable if the pasture is distant from the buildings. Lanes should be so planned as to save labor without undue waste of fencing and land. The width of lanes should be proportional to the number of cows using them. They should be wide enough so that there will be no danger of injury to the cows thru crowding, and also wide enough so that they will not be converted into

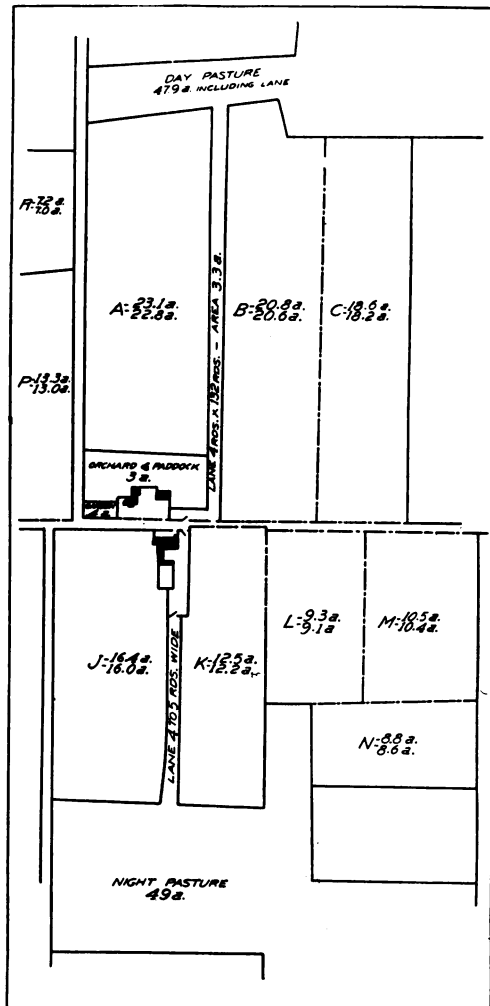


FIG. 145. PLAN OF THE FARM SHOWN IN FIGURE 144, ILLUSTRATING HOW A LANE COULD BE RUN FROM THE BARNYARD TO THE PASTURE, BETWEEN FIELDS A AND B

Such a lane would save much time, besides greatly lessening the danger of injury to the cattle by automobiles

mud holes in wet weather. In general, a width of one rod for every ten cows using a lane will be satisfactory.

On some farms with little stock the lanes are unnecessarily wide and thus there is a waste of valuable crop land. If they are not used as passageways for stock, unfenced lanes or driveways may be used to give convenient access to crop fields. These driveways occupy little land, and, being unfenced, may be changed as desired.

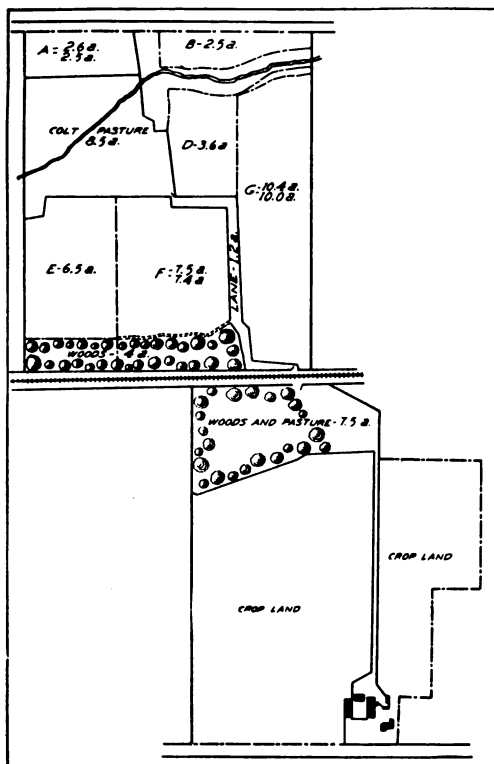


FIG. 146. PLAN OF A WESTERN NEW YORK FRUIT FARM, SHOWING AN UNNECESSARY WIDE LANE WHICH OCCUPIES 1.2 ACRES OF TILLABLE LAND BETWEEN FIELDS F AND G

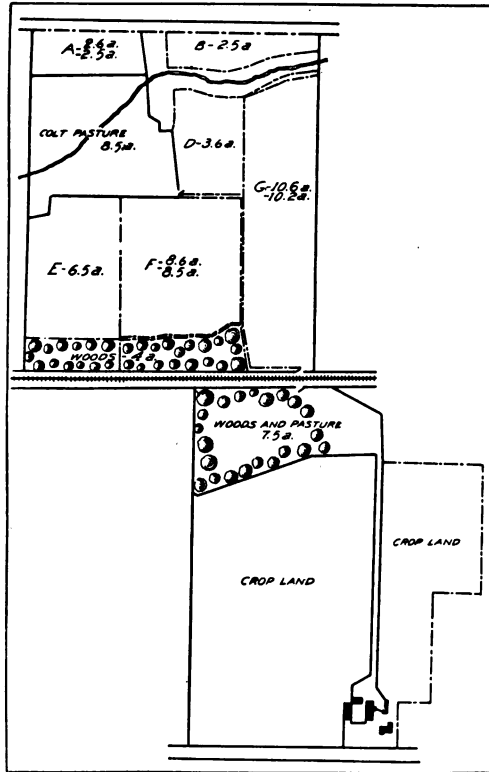


FIG. 147. PLAN ILLUSTRATING HOW THE UNNECESSARY LANE SHOWN IN FIGURE 146 COULD BE ELIMINATED, SAVING AN ACRE OF GOOD LAND AND THE UPKEEP OF 150 RODS OF FENCE

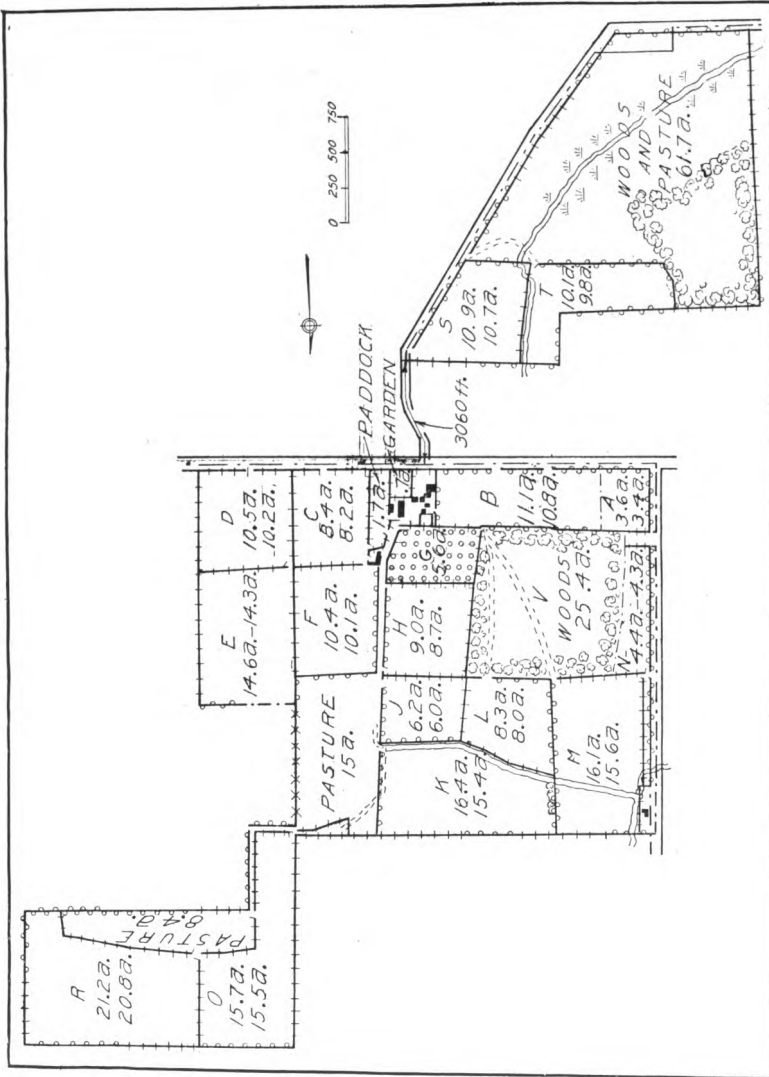


FIG. 148. UNECONOMIC WOODLAND ON A WESTERN NEW YORK FARM

The woodlot V occupies level tillable land near the buildings and is worth \$100 an acre if cleared. This is a large farm with relatively small fields, many of which are of undesirable shape. It could be easily and cheaply rearranged by taking out some unnecessary fences and tiling one open ditch.

Farm area, 306.2 acres

Average size of farmed fields, 10.4 acres

Average distance to farmed fields, 118 rods

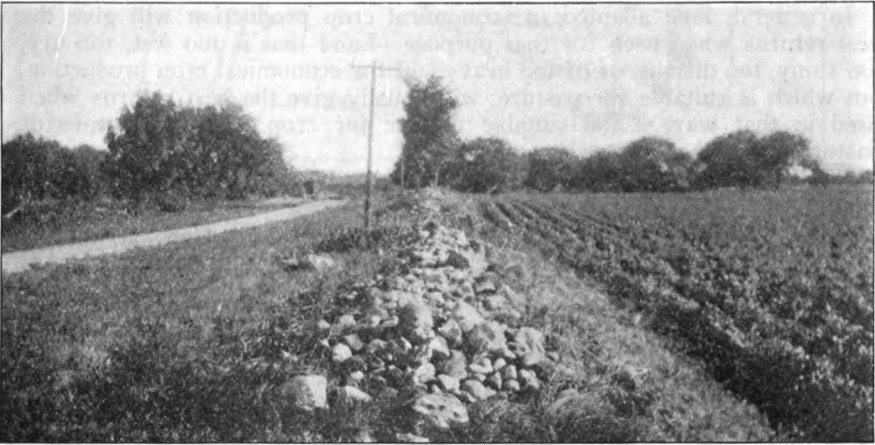


FIG. 149. A STONE ROW ALONG A HIGHWAY, WHICH RENDERS USELESS AN ACRE OF LAND WORTH \$100

By clearing away these stones, a strip of land 2 rods wide could be added to the adjoining field

Use of land

Beside the foregoing considerations, a good farm layout should provide for using the land for the most profitable purpose. Crop land produces a greater net value of product than does pasture or woodland, and therefore all the land that can be economically worked under existing conditions is usually cropped. If land suitable for crop production is used as pasture or woodland, it loses its advantage and competes directly with the large areas of cheap land good only for such purposes.

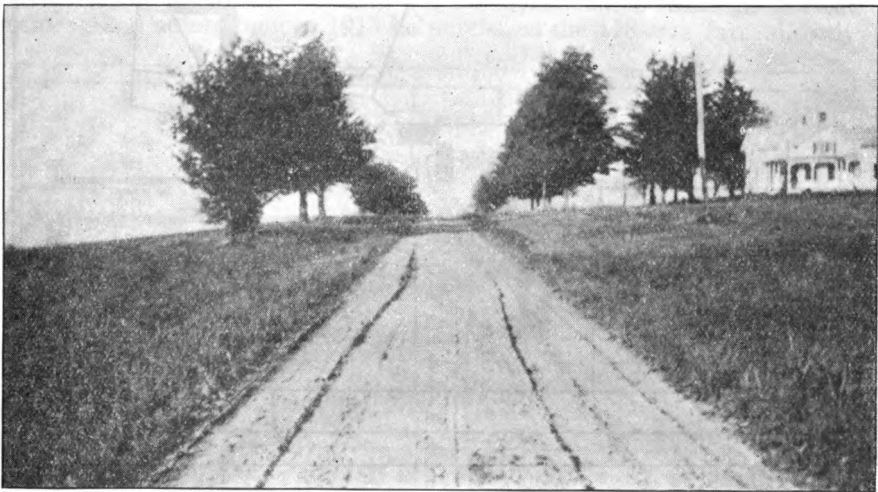


FIG. 150. WHERE ROAD FENCES ARE UNNECESSARY, THEIR REMOVAL PERMITS FARMING TO THE ROAD DITCH

This road occupies less than a rod of land

In general, land adapted to economical crop production will give the best returns when used for that purpose. Land that is too wet, too dry, too stony, too distant, or of too heavy soil for economical crop production, but which is suitable for pasture, will usually give the best returns when used in that way. Land suitable neither for crop production nor for pasture should be used as a woodlot.

Farmstead

The farmstead should be planned to make the best use of land as well as of labor. As previously stated, with farms of small or moderate size it is best to locate the farmstead as near the center of the crop land as it can be placed and still be on the highway. The arrangement with the house on one side of the road and the barn on the other is usually bad. The house should be located far enough from the road to escape dust, but not far enough to make too large a lawn. The best location for the barn is at a convenient distance behind the house. The garden should be near the house and so arranged as to save labor. Where hogs or cattle are kept, it is advantageous to have small paddocks or pastures close to the buildings.

The farm buildings should be concentrated rather than scattered, and should be arranged to save labor. Altho the fire risk is somewhat greater,

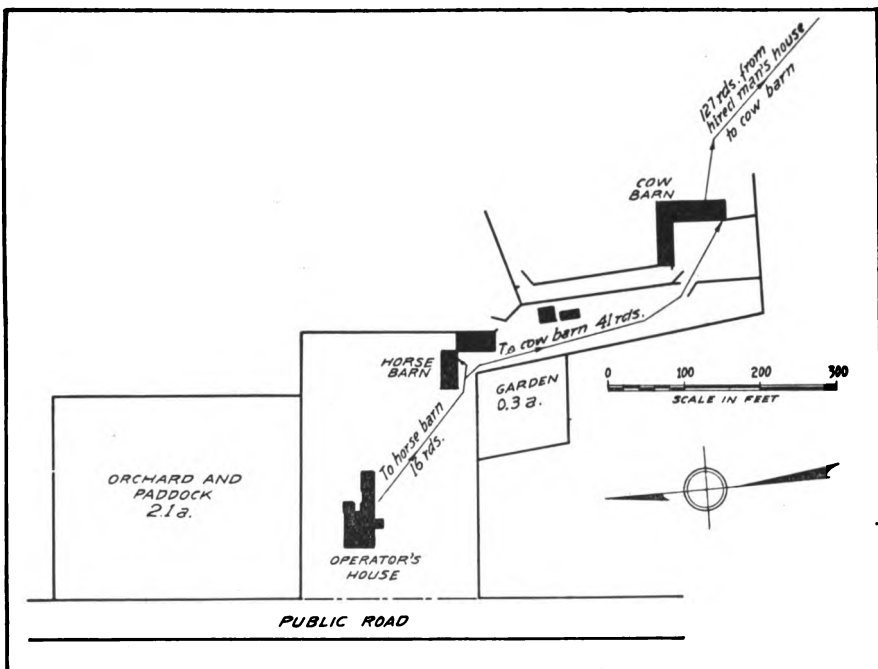


FIG. 151. AN ARRANGEMENT REQUIRING MUCH UNNECESSARY TRAVEL

The area of land occupied by the buildings of this farmstead is 2.82 acres, or $1\frac{1}{4}$ per cent of the farm area. More than 700 miles of walking would be saved yearly if the cow barn were 500 feet nearer the house

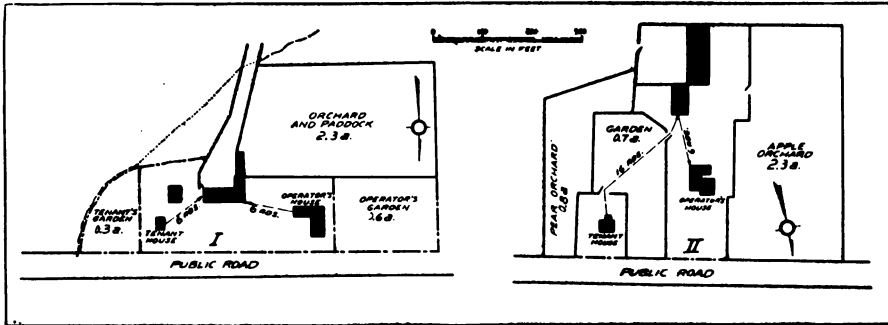


FIG. 152. TWO WELL-PLANNED FARMSTEADS

fire insurance is cheaper than wasted labor and materials due to scattered inconvenient buildings. Usually the barns must be at least 100 feet from the house if the lowest insurance rates are to be obtained. Tenant houses should be convenient to the barns but far enough from the owner's house so that the two families can live in harmony.

ACTUAL REARRANGEMENTS MADE BY THE OWNERS OF SOME NEW YORK FARMS

Altho on many farms the rearrangement of the layout to meet conditions of the present day has received little attention, on some farms such changes have been and are being made. A few of the rearrangements actually made or being made by New York farmers are shown in the following pages.

The plan of a northern New York farm as it was in 1912 is shown in figure 153. This farm was rather long and narrow, with the buildings at one end. The owner of the farm needed more land to make an efficient business, and accordingly in 1913 he purchased the 118-acre farm directly

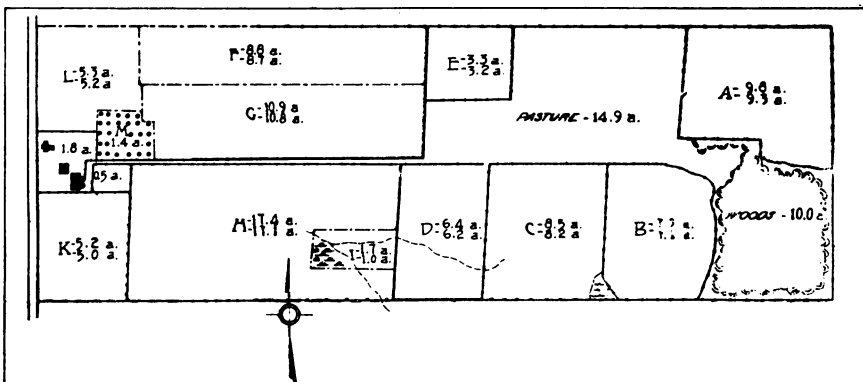


FIG. 153. PLAN OF FARM A, IN NORTHERN NEW YORK, IN 1912

Farm area, 116 acres
Average size of farmed fields, 7.4 acres
Average distance to farmed fields, 74 rods

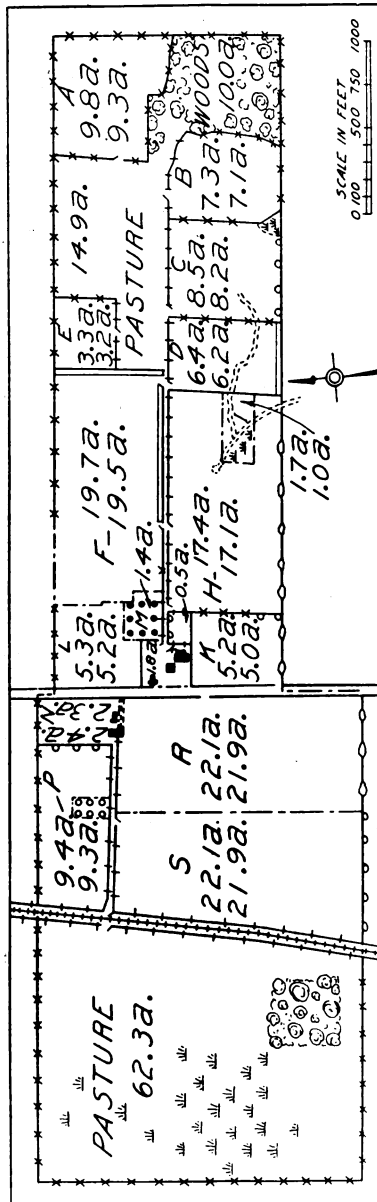


FIG. 154. FARM A, IN 1917

In 1913 the 118-acre farm across the road was purchased, making the total farm area 234 acres. In this case, the buildings were brought into the middle of the farm by buying the land across the road. Altho the farm was double in size, the average distance to the fields was decreased. Since 1913 the layout has been further improved by enlarging and combining some of the crop fields

Farm area, 235.3 acres
Average size of farmed fields, 10.5 acres
Average distance to farmed fields, 64 rods

across the road, making a total farm area of 234 acres. The crop land on the new farm was more convenient for farming than the land of the original farm. Altho the farm was doubled in size by the purchase, the average distance to the crop fields was actually decreased.

By this combination two small farms, either one of which was too small to furnish a satisfactory living with the type of farming made necessary by soil and other conditions, were combined into one farm large enough to be operated successfully and economically. The large area of pasture on the newly purchased farm was needed for keeping a good-sized herd of cows. It was easily reached by the lane and a cattle pass under the railroad. The additional house was used by a hired man, and the barn for young stock.

Since 1913 many of the fields have been combined and enlarged. The plan of the farm as it was in 1917 is shown in figure 154. As a result of the rearrangement, there are four main fields of good size and shape, and several smaller fields. The small fields (A, B, C, D, and E) are pastured in rotation, as the soil is very sandy and does not hold grass well. The changes that have been made in the field arrangement did not require the moving of a single fence. All that was needed was a little care and thought in planning crops so that the fields could be combined. There is opportunity for still further improvement in the layout.

This plan is an example of locating the buildings in the middle of the farm by buying the land across the road. Not only was the layout improved by this means, but also one successful farm was made of two unprofitable ones.

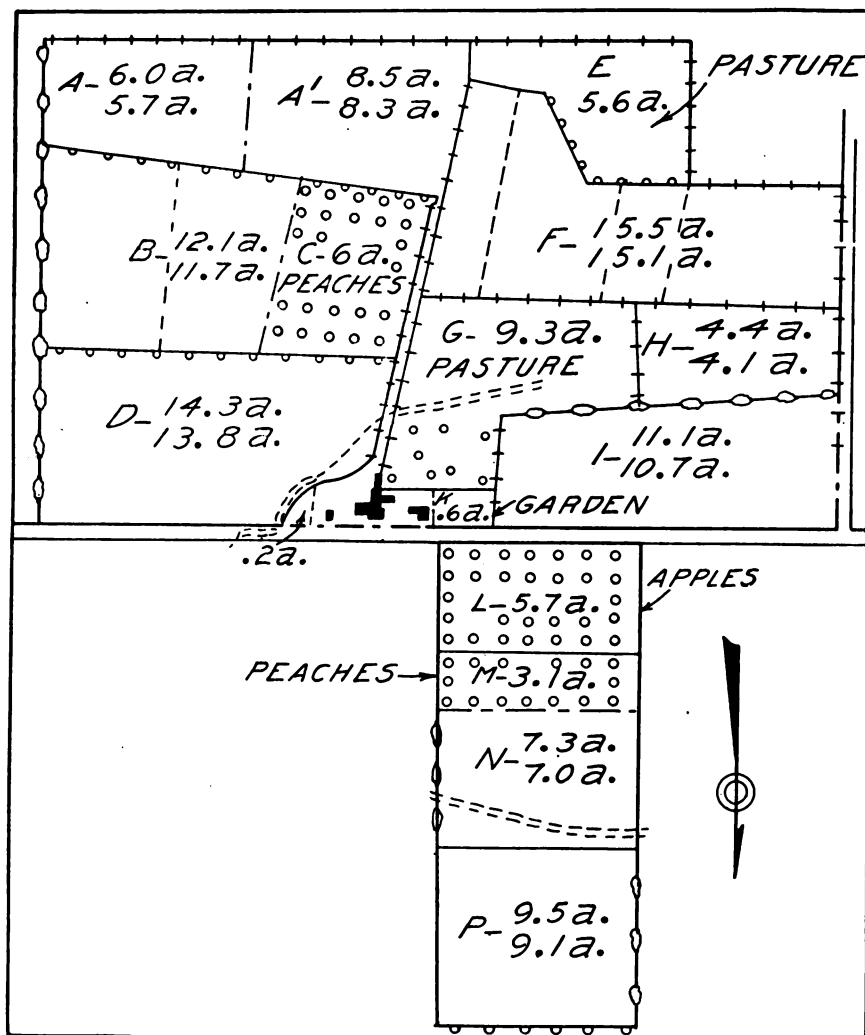


FIG. 155. PLAN OF FARM B, IN WESTERN NEW YORK, IN 1910

This layout illustrates the chance way in which most farm arrangements have developed. Field E happened to be a wet piece of land and was therefore put into pasture. This made a lane necessary. The lane was run directly from the barn to the pasture, diagonal to the farm lines. A peach orchard was planted along the lane, with rows parallel to it, thus fixing its location permanently. Every field on the farm was irregular in shape, with a greater or less number of short rows. Even fields of fairly good size, which could have been farmed in one piece, were farmed in small patches. The fence lines were full of stone and brush, and wasted much land. The brush and stone fence between fields H and I, for instance, occupied a strip of land about 24 feet wide, and the rail and stone fence between fields A and B occupied a strip of land 14 feet wide

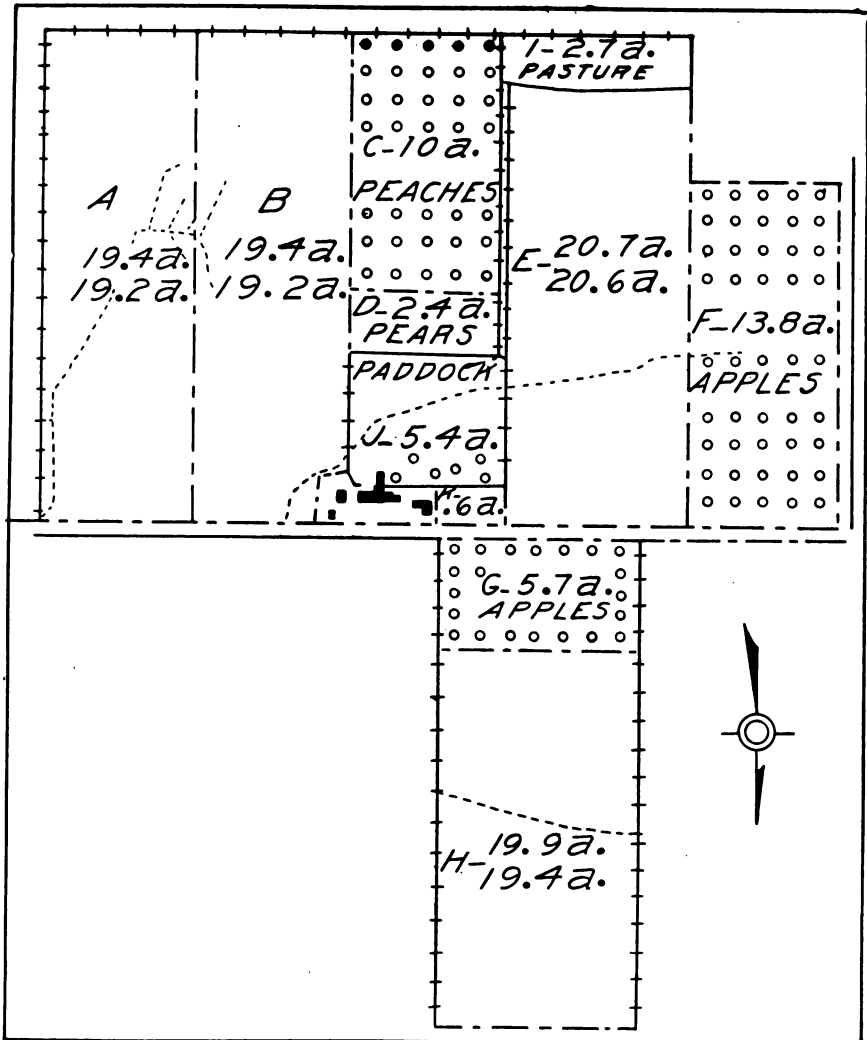


FIG. 156. REARRANGEMENT OF FARM B

Instead of small, irregular fields, as in the original plan, there will be four large rectangular fields of about 20 acres each and averaging nearly 100 rods long. About 10 acres of crop land has been gained, 3 acres by clearing fence rows and 7 acres from pasture. Much more important than this, however, is the saving of labor made possible by improving the size and shape of the fields. The work has been done at odd times, and has not interfered with the successful operation of the farm. The owner is making an excellent living from the farm, is enjoying life, and at the same time is constantly making his farm more valuable

Farm area, 125.4 acres

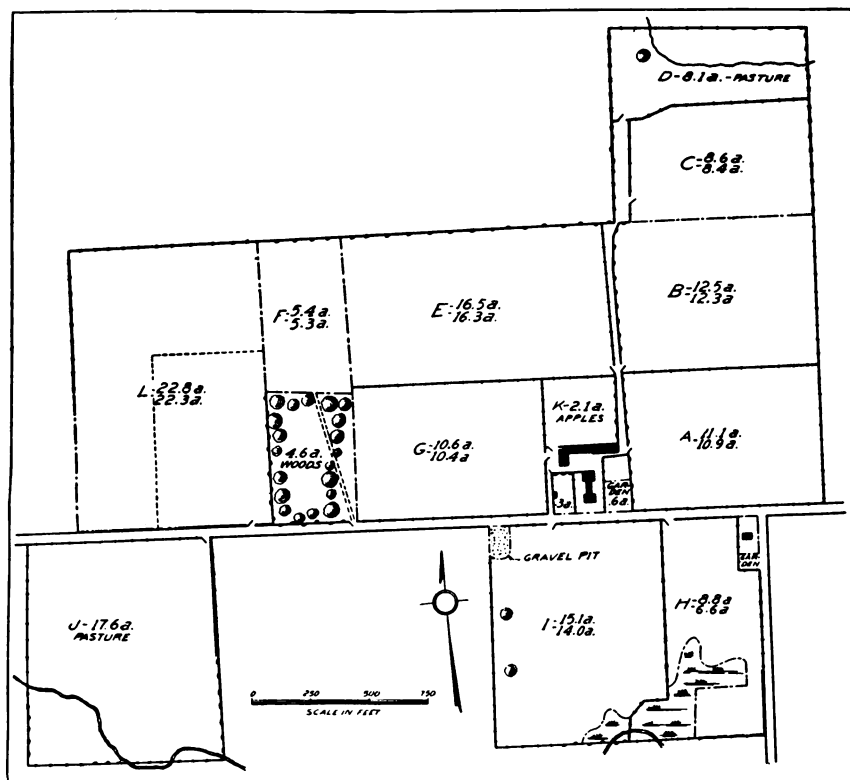


FIG. 157. PLAN OF FARM C, IN 1917

Most of the fields are of good size and shape. A four- or five-years rotation is followed. Fields A and C, B and G, H and I, and E and F have been farmed together, each pair of fields making up a year of the rotation. There are some unnecessary fences that could easily be removed.

The land appearing as field L on this plan formerly belonged to a farmer who lived three-quarters of a mile away. Being located far from the buildings of the owner, this land had received no manure and but little care for many years. The land was run down and the fence rows were full of brush and stones. It was evidently worth much more as a part of an adjoining farm, and the change in ownership finally took place.

Farm area, 149.4 acres

Average size of farmed fields, 10.6 acres

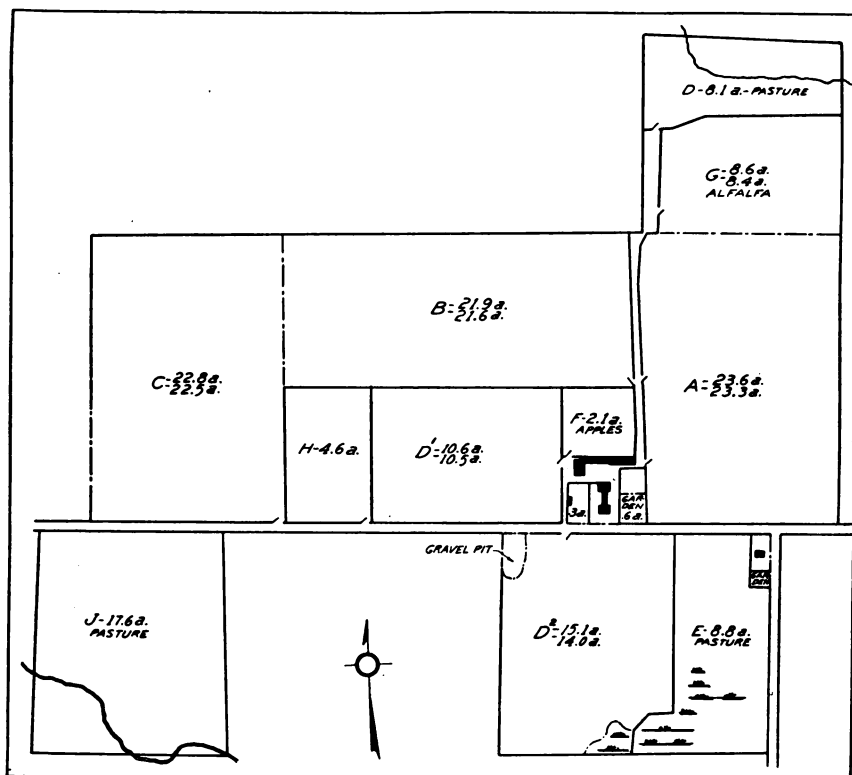


FIG. 158. A POSSIBLE REARRANGEMENT OF FARM C

Few changes would be required to enlarge and combine the fields. Four main crop fields of about 23 acres each are provided for a four-years rotation. Fields A, B, and C would be farmed separately, while D¹ and D² would make up the fourth year of the rotation. Field G would be left in alfalfa permanently. The necessary changes are relatively few, and could be made in a few years

Farm area, 149.4 acres
Average size of farmed fields, 16.7 acres
Average distance to farmed fields, 38 rods

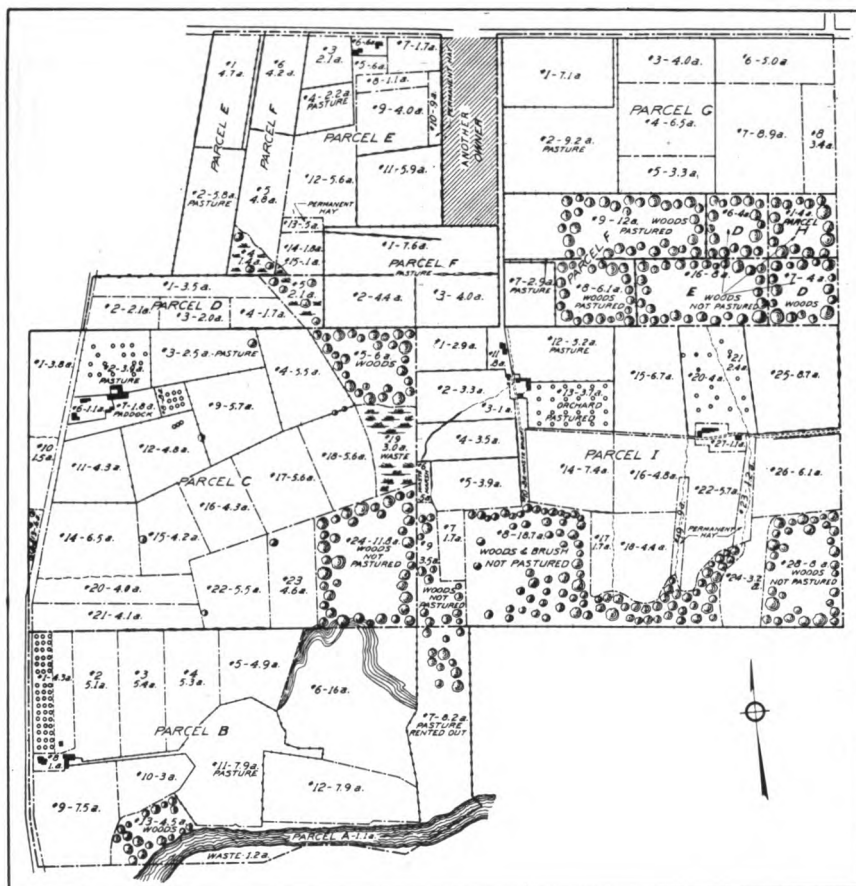


FIG. 159. PLAN OF FIFTEEN FARMS AND PARTS OF FARMS WHICH HAVE BEEN COMBINED INTO ONE FARM, D, OF 477.8 ACRES

The crop land of these farms was divided into sixty-nine small, irregular fields, averaging 4.2 acres each. Except for a part of parcel B, the land was practically level, the small size and irregular outline of the fields being due, largely, to the accidents of clearing. The buildings of these farms have likewise been rearranged to adapt them to present conditions. The main farmstead has been developed at the center of the farm, where it is convenient to all the fields. A house and a few barns were already located at this point, and by using these barns and the frames and lumber from the other barns scattered over the original farms, a well-planned, centralized set of buildings has been developed. They have adequate storage capacity and are conveniently arranged for work.

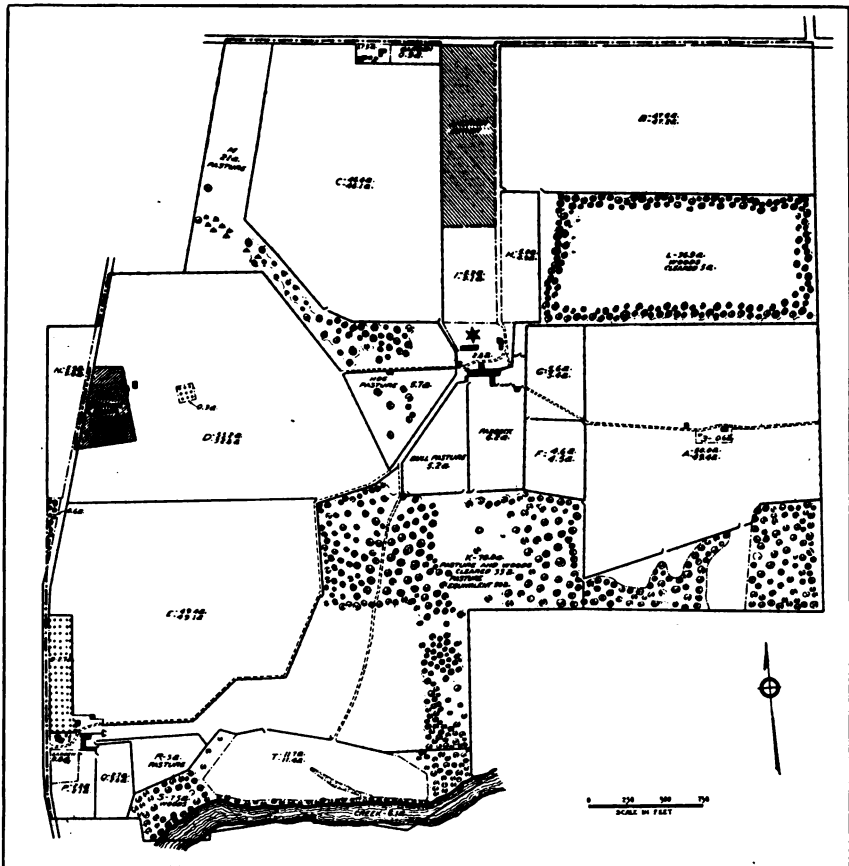


FIG. 160. FARM D, SHOWN IN FIGURE 159, AFTER REARRANGEMENT

Instead of sixty-nine small, irregular crop fields, there are now five main crop fields averaging 50 acres each, convenient to the buildings. Larger fields permit the effective use of larger machines and more horses to the team, and thus greatly increase the efficiency of labor. The four small crop fields (F, G, H, and I) are used for a secondary rotation of beets, potatoes, and other minor crops. The new plan also provides for a better use of land. About 7 acres were added to the crop land by cleaning out hedgerows and by tiling open ditches. Much land formerly idle has been added to the pasture area. Some land too steep or too poor to be cropped has been changed to pasture, while other land very well adapted to crop production has been changed from pasture to crop land.

Farm area, 477.8 acres
Average size of farmed fields, 28.5 acres
Average distance to farmed fields, 60 rods

HOW TO PLAN A FARM REARRANGEMENT

The preceding discussions give some of the specifications for a good farm layout. Two ideal farm plans are shown in figure 161. It is probably worth while to see what an ideal arrangement is like, even tho it would be impossible to arrange most New York farms so as to satisfy all the requirements of an ideal farm layout. There are natural limitations which prevent many farms from ever having even a moderately good layout. Perhaps the most important of these natural limitations is topography. Given fairly fertile land, its topography usually determines whether it shall be cropped or pastured. If a field is too steep for machine operation, it must be pastured. In the hilly parts of New York it is necessary to crop all the land that is level enough. The field lines of such farms, therefore, follow the contour lines, with small, crooked fields as the usual result. Since topography cannot be altered, the shape and the size of the fields on many farms are limited by this factor.

Soil differences limit the development of a farm layout to some extent. It is preferable to have all the soil in one field fairly uniform. Usually

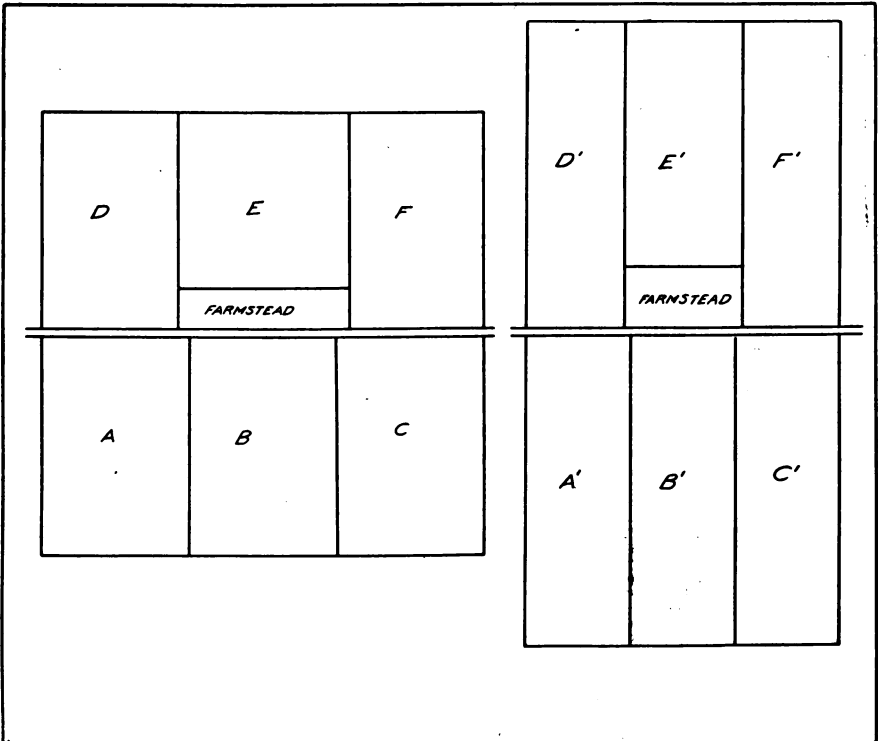


FIG. 161. TWO GOOD FARM LAYOUTS

If a 160-acre farm had either of these field arrangements, the average distance to fields would be less than 30 rods

the differences in soil between adjoining fields are not great enough to make this factor important. Differences in drainage are also important in combining fields. All the land in a field should have uniform drainage, as otherwise the whole field must wait for the wet land to dry. The drainage can be made uniform, in many cases, by tiling the wet areas.

In spite of natural limitations, it is possible and practicable to improve greatly the layout of nearly all farms. There is no one particular layout to fit all cases. Every farm is an individual problem, and must be studied and considered separately.

The first step in planning the rearrangement of a farm is to study the farm and the conditions surrounding it. For this purpose it is well to have a map of the farm. This need not be an engineer's map, accurately drawn to scale; a rough plan showing the relative sizes, shapes, and locations of the various fields will serve. The more accurate the map, the worse, usually, will it make the farm look. In addition to the map, it is necessary to have a thoro knowledge of the soil, the drainage conditions, and the topography of the farm, such as comes only from working it for several years.

The second step in planning a rearrangement is to decide on the cropping plan that is to be followed. While it is not possible to follow a rigid crop rotation on most farms, it is advisable to follow a fairly definite cropping plan. Knowing the crops that are to be grown, the acreage needed for each, and the crop area available, a cropping system can be planned which will satisfy all requirements. If two rotations are followed, two sets of fields, perhaps of different sizes, will be necessary.

Finally, after studying the farm and deciding on the system of farming and the crop rotation to be followed, plans should be made for the long-time development of the farm that will provide the best layout possible in view of the natural limitations. Much thought and study will be necessary in making a good farm plan. As far as natural limitations allow, this plan should include the following:

Large fields. Large crop fields permit greater economy of labor, fencing, and land. Hence, the farm fields should be as large as the size of the farm, the length of the rotation, the type of farming, and the physical factors will allow.

Well-shaped fields. The oblong shape permits the most efficient use of labor, but the square shape is the most economical of fencing and of land. Since saving labor is usually more important than saving land and fencing, oblong shapes, one and a half to three times as long as their width, are most desirable for crop fields of moderate size. Very large crop fields may be square to save fencing and yet be long enough to permit the efficient use of labor. Irregular shapes should be avoided when this is possible without too great expense.

Fields convenient to farmstead. The distance from farmstead to fields should be made as short as possible in order to save useless travel. On farms of moderate size, the farmstead should be located as near the center of the farm as it can be placed and still be on the highway. The ideal arrangement is to have half of the land on each side of the highway, with the buildings in the center of the farm. The best way to locate the buildings in the center of the farm is to buy the land across the road, when this is possible.

Fields free from obstructions. Crop fields should be free from obstructions, such as swampy spots, open ditches, streams, trees, and stone piles.

Fences well planned. All fences waste more or less land and involve upkeep costs, and therefore unnecessary fences should be eliminated. Necessary fences should be constructed so as to waste as little land as possible. The best fence is woven wire with a strand of barbed wire at the top; but this is also an expensive fence. Barbed wire is the cheapest fence that will turn stock satisfactorily.

Convenient lanes and driveways. Lanes and driveways should be carefully planned to give convenient access to the fields without unnecessary waste of fencing or land.

Most profitable use of land. The various kinds and qualities of land should be used for the purposes that pay best. In general, land suitable for economical crop production should be cropped. Land that is not adapted to economical crop production but that will make good pasture, should be pastured. Land not suited to either of these purposes should be used as woodland.

Well-planned farmstead. The farmstead should be planned for efficient use of labor and materials. Concentrated buildings save useless travel.

The plans for the long-time development of the farm should be worked out slowly, and the actual work should be done at times of slack farm work. The savings from farm rearrangement are seldom large enough to pay the entire cost in one year. If properly planned, however, such work helps in the labor distribution by keeping the men profitably employed when there is little other work to be done. Small fields can gradually be combined into larger units without radical changes in the rotation. It is usually unnecessary and unwise to plow up a good new seeding in order to combine two fields; the same results might be accomplished in a year or two by repeating a crop on one of the fields, or by leaving down a piece of hay for another year.